Check List 10(2): 453–456, 2014
© 2014 Check List and Authors
ISSN 1809-127X (available at *www.checklist.org.br*)

Check List
Journal of species lists and distribution

NOTES ON GEOGRAPHIC DISTRIBUTION

Novelties in Passifloraceae from the Brazilian Amazon

Ana Kelly Koch [1*], André Luiz de Rezende Cardoso [2] and Anna Luiza Ilkiu-Borges [2]

1 Instituto de Botânica de São Paulo, Núcleo de Pesquisa Orquidário do Estado. Av. Miguel Estéfano, Água Funda, CEP 04301-902, São Paulo, SP, Brazil.
2 Museu Paraense Emílio Goeldi, Coordenação de Botânica. Av. Perimetral, Terra Firme, CEP 66077-830, Belém, PA, Brazil.
* Corresponding author. E-mail: *anakbio@gmail.com*

ABSTRACT: This paper presents new records of *Passiflora* L. from the Brazilian Amazon, contributing to the knowledge about the taxonomy and distribution of Passifloraceae in Brazil. The following species are reported for the first time: *Passiflora garckei* Mast. in Brazil; *Passiflora candida* (Poepp. & Endl.) Mast. in Amapá state; *P. retipetala* Mast. in Pará state; and *P. tholozanii* Sacco in Maranhão state.

Passiflora L., the largest genus of Passifloraceae, includes about 575 species largely distributed in tropical forests of Central and South America and ca. 22 species in Southeastern Asia, Australia, and Pacific Islands (Ulmer and MacDougal 2004). In Brazil, the genus is represented by 141 species, occurring in all states (Bernacci *et al.* 2014).

Except for classical treatments of Masters (1872), Killip (1938), and more recent papers of Cervi *et al.* (2012) and Milward-de-Azevedo *et al*. (2012), studies on *Passiflora* in Brazil are almost restricted to the Atlantic Forest and Cerrado biomes (Cervi and Linsingen 2008; Milward-de-Azevedo 2008; Mondin *et al.* 2011).

In the Brazilian Amazon, *Passiflora* is poorly known and few works were carried, such as one key for 20 species of Passifloraceae from the Adolpho Ducke Forest Reserve, in Manaus (Hopkins and Souza 1999), and also a description of *Passiflora cordistipula* Cervi (Cervi 2002). Recently, four new species were described for the Brazilian Amazon, *Passiflora kikiana* Cervi & Linsingen (Cervi and Linsingen 2010), *Passiflora cristalina* Vanderpl. & Zappi (Vanderplank and Zappi 2011), *Passiflora fissurosa* M.A.D. Souza (Souza and Hopkins 2011), and *Passiflora longifilamentosa* A.K.Koch *et al.* (Koch *et al*. 2013). Two taxonomic studies on the group were published by Cruz *et al.* (2013) *Passiflora* in the Urucu Petroleum Province, Coari, Amazonas, and Silva *et al*. (2013) with Passifloraceae in the Environmental Protection Area of Belém, Pará. However, further taxonomic studies on the genus and family are still needed for the Brazilian Amazon.

After examining herbarium collections of *Passiflora* from MG (Museu Paraense Emílio Goeldi) and IAN (Embrapa Amazonia Oriental), as well as fresh material collected in different areas from Amazon, we found species which were not yet recorded both from Brazil and from different states of the Brazilian Amazon. This paper presents new records of *Passiflora* L. from the Brazilian Amazon, and contributing to the knowledge about the taxonomy and distribution of Passifloraceae in Brazil.

The terminology for morphological structures was based on Radford *et al.* (1974), Killip (1938), Cervi (1997), and Ulmer and McDougal (2004). The abbreviations of author names are in accordance with Brummitt and Powell (1992). The taxonomical treatments and geographical distribution of taxa were based on Killip (1938), Ulmer and McDougal (2004), and Bernacci *et al.* (2014).

Three species were found to be new records for Amazonia and *Passiflora garckei* is a new occurrence to Brazil. The other species are new records for different states of Brazilian Amazon specifically: *Passiflora candida* for the state of Amapá; *P. retipetala* for Pará, and *P. tholozani* for Maranhão.

Passiflora candida (Poepp. & Endl.) Mast., Trans. Linn. Soc. London, 27: 629. 1871. Figure 1A.

Plant vine, pubescent. Stem terete, striate, tomentose. Stipules lanceolate, hairy, ca. 5 mm long. Petioles 0,7–1,5 cm long, hairy, with one pair of patelliform, sessile glands, ca. 1 mm diam., 0,6–1,4 cm from the base of the petiole. Leaves elliptic to large-elliptic, entire, 8,2–15,2 × 3,8–8 cm, slightly rounded at base, acuminate at apex, pinnately veined, coriaceous, adaxially glabrous, abaxially hairy, margins entire, inconspicuously toothed, nectaries present, 18–24 pieces. Tendrils weakly developed. Flowers solitary, from older parts of the plant, pendent; pedicel terete, hairy, 0,7–1 cm long; bracts absent; hypanthium campanulate, 2–2,5 cm long, hairy; sepals lanceolate, 2,3–3,5 × 0,7–1,2 cm, straight at base, acuminate at apex, white, hairy from beneath; awn absent; petals lanceolate, 2,3–3,5 × 0,7–1,2 cm, white, straight at base, acuminate at apex. Corona filaments of 4 series; outer series exceeding the second rank, wavy at apex, ligulate, ca. 2,5 cm long, slightly inclined; second series stout at apex, linear, 2–3 mm long, erect; third and fourth series capillary, less than 1 mm long, declined; operculum membranaceous, margin fimbriate. Trochlea absent. Androgynophore ca. 4,5 cm long; ovary pubescent, ca. 1 cm long, ca. 4 mm diam. Fruits not seen.

Specimens examined: **BRAZIL. Amapá:** Oiapoque, 05/X/1949, fl., Black 8383 (IAN); Macapá, Fazenda Itauqueiro, 16-IV-1997, fr., Cordeiro 2547 (IAN); Parque Nacional Montanhas do Tumucumaque, Rio Mutum, 05-XI-2005, fl., Lobão and Cordeiro 1165 (IAN).

Passiflora candida is placed in the subgenus

Astrophea, supersection *Pseudoastrophea*, and section *Pseudoastrophea*, which consists of 17 species of scandent shrubs or vines with often well-developed tendrils (Ulmer and MacDougal 2004). This species can be found in Brazil, Guyana, Suriname, and Venezuela (Ulmer and MacDougal 2004). In Brazil, *P. candida* was recorded only in Amazonas, Acre, Roraima and Pará (Killip 1938; Bernacci *et al.* 2014). This is the first record for the state of Amapá, where it was collected in three different locations (Figure 3).

Passiflora garckei Mast., Trans. Linn. Soc. London, 27: 639. 1871. Figures 1B-2A.

Plant vine, glabrous. Stem terete, striate, glabrous. Stipules subovate, slightly falcate, glabrous, 2,1–3,2 × 1,2–1,7 cm long, greenish, margins serrate-glandular, 7–9 pieces. Petioles 2,8–4,5 cm long, glabrous, with 5–6 patelliform, sessile glands, 0,5–1 mm diam., 0,5–1 cm from the base of the petiole. Leaves 3-lobed, 3–7 × 5,2–11,3 cm, cordate at base, slightly mucronate at apex, palmately veined, coriaceous, glabrous, greenish, margins entire, slightly serrate, nectaries presents, 30–48 pieces. Tendrils well-developed, greenish. Flowers solitary, from younger parts of the plant, pendent; pedicel terete, glabrous, 1–1,3 cm long; bracts verticillate, oblong-lanceolate, free from the hypanthium, inserted 0,8–1 cm below the flower, ca. 6 × 3 cm, margin slightly serrate with 8–16 glands, bracts greenish; hypanthium campanulate, 5–8 mm long, glabrous, greenish; sepals oblong, 4–4,3 × 1,4–1,8 cm, slightly rounded at base, rounded at apex, abaxially greenish, adaxially white-purplish; awn present, greenish, 3–4 mm long, linear; petals oblong, 3–3,4 × 1,2–1,4 cm, white-purplish, rounded at base, rounded at apex. Corona filaments multiseriate; outer series exceeding the second rank, wavy at apex, filiform, 3–3,5 cm long, declined, purple above, white below; other series capitate at apex, filiform, 7–8 mm long, declined or erect, white; inner series capitate at apex, 5–7 mm long, erect, white; operculum membranaceous, margin entire, white. Trochlea absent. Androgynophore 3,5–4 cm long, greenish-yellow; ovary glabrous, greenish, 7–8 mm long, 5–6 mm diam. Fruits not seen.

Specimens examined: **BRAZIL. Pará:** Barcarena, right margin of Pará river in secondary vegetation, 1°36′2.52″ S, 48°47′23.46″ W, 20-I-2012, fl., L.E. Araújo-Silva 01 (MG).

Passiflora garckei is a member of the subgenus *Passiflora*, supersection *Stipulata*, section *Granadillastrum*. The subgenus is composed of approximately 240 species, which are characterized by exuberant flowers, corona usually divided into tracks or various colors (Ulmer and MacDougal 2004). This species occurs in Guyana, Suriname, and Venezuela, where it is usually semi-cultivated for edible fruit (Killip 1938; Ulmer and MacDougal 2004). It is now first recorded to Brazil at the greater Belém region, Pará (Figure 3).

Passiflora retipetala Mast., Bull. Misc. Inform. Kew 1893: 12. 1893. Figures 1C-2B.

Plant woody vine, glabrous. Stem terete, striate, glabrous. Stipules subovate, slightly falcate, glabrous, 1,2–1,8 × 0,7–0,9 cm long, green, margin crenate-glandular, 10–12 pieces. Petioles 1–3,2 cm long, glabrous, with 8–10 patelliform, sessile glands, ca. 1 mm diam., 1–3 mm from the base of the petiole. Leaves 3-lobed, 2–7,8 × 2,2–9 cm, straight at base, mucronate at apex, veined

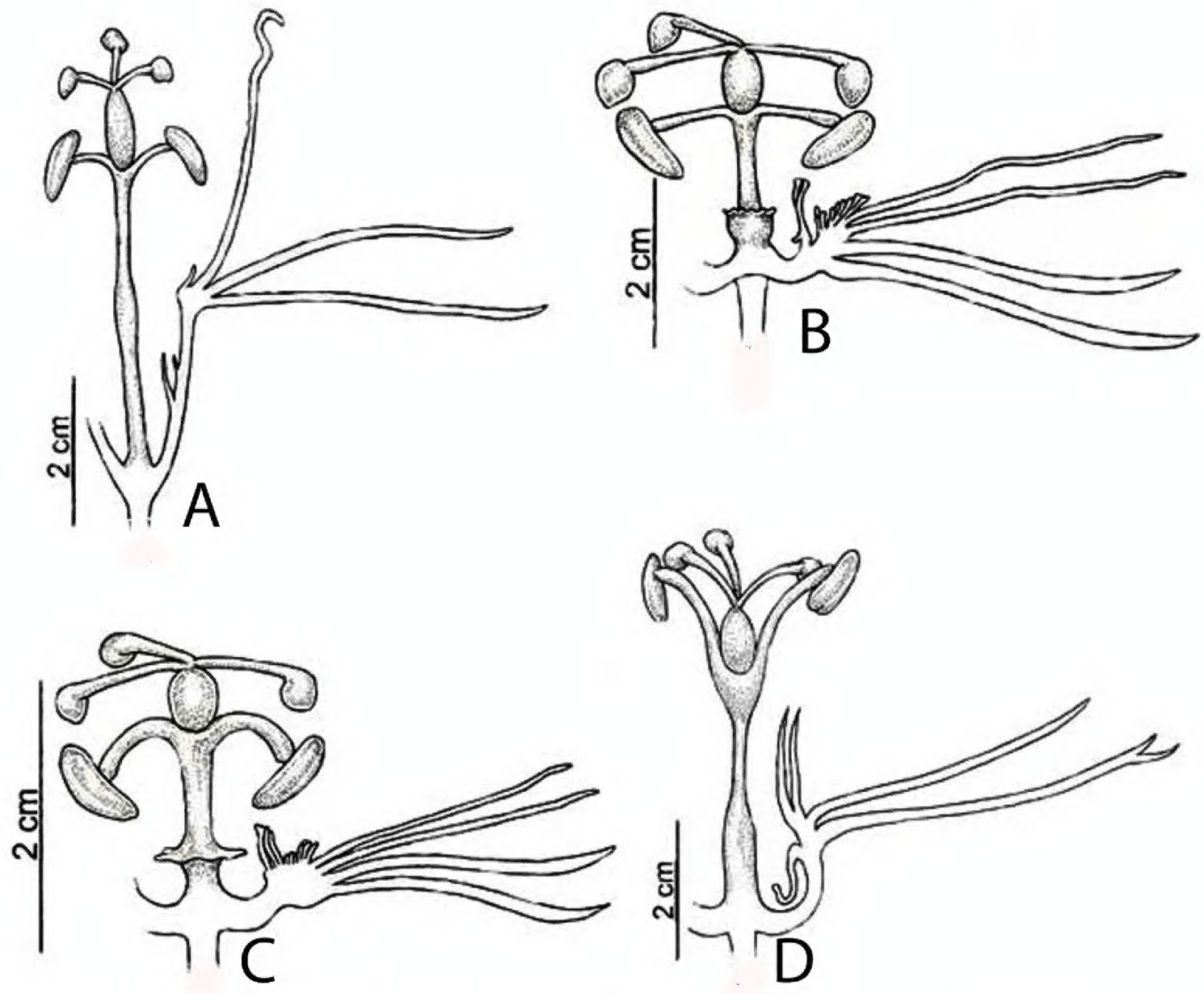

Figure 1. Longitudinal section of dissected flowers of Passiflora species. A) *Passiflora candida* (Poepp. and Endl.) Mast. (Lobão and Cordeiro 1165 - IAN); B) *Passiflora garckei* Mast. (A. Cardoso 901- MG); C) *Passiflora retipetala* Mast. (Silva 3555 - MG); D) *Passiflora tholozanii* Sacco (Balée 934 - MG); Illustrations by João Silveira.

palmately, subcoriaceous, glabrous, greenish, margins entire, nectaries presents, 35–36 pieces. Tendrils well-developed, greenish. Flowers solitary, from younger parts of the plant, erect; pedicel terete, striate, glabrous, 3–4 mm long; bracts verticillate, oblong-lanceolate, free from the hypantium, inserted 3–4 mm below the flower, 2–2,3 × 1–1,3 cm, margins crenate-glandular with 26–28 glands, bracts greenish; hypanthium campanulate, 7–8 mm long, glabrous, greenish; sepals lanceolate, 3–3,5 × 1–1,2 cm, straight at base, rounded at apex, abaxially greenish, adaxially greenish-white; awn present, greenish, less than 1 mm long, hooked; petals linear-lanceolate, 3–3,5 × 1–1,2 cm, greenish-white, straight at base, rounded at apex. Corona filaments multiseriate; outer series exceeding the second rank, stout throughout at apex, filiform, ca. 2,5 cm long, declined, white from the base to the middle, purple towards the apex; second series stout throughout the apex, filiform, ca. 1,9 cm long, declined, white from the base to the middle, purple towards the apex; other series capitate at apex, filiform, 3–4 mm long, inclined or erect, greenish-white; innermost series capitate at apex, filiform, 2–5 mm long, erect, greenish-white; operculum membranaceous, plicate, margin slightly jagged, greenish-white. Trochlea present. Androgynophore ca. 3 cm long, greenish-yellow; ovary glabrous, greenish-yellow, ca. 7 mm long, ca. 5 mm diam. Fruits not seen.

Specimens examined: **BRAZIL. Pará:** Oriximiná, Porto Trombetas, National Forest Saracá-Taquera, on railroad margin, 21-VI-2011, fl., J.B.F. da Silva 3555 (MG).

Passiflora retipetala is similar to *Passiflora garckei*, due to the 3-lobed leaves and oblong-ovate stipules, differing from the latter species by the blue color marked corona, the non-wavy apex of the filaments of the outer series, the higher number of glands on the petiole, and trochlea present. It is naturally found in Trinidad and Tobago, the Guianas, and northeastern Brazil, where it occurs at altitudes of 500-1000 m (Ulmer and MacDougal 2004). In Brazil, it was only known from the state of Amazonas (Bernacci *et al.* 2014). Here it is recorded for the first time from Pará state, where it was collected at the edge of the Mineração Rio do Norte railroad, growing in secondary forest (Figure 3).

Passiflora tholozanii Sacco, Ann. XV Congr. Soc. Bot. do Brasil 1: 151. 1967. Figures 1D-2C.

Plant liana, pubescent. Stem terete, slightly angled, tomentose. Stipules linear, subulate, hairy, ca. 4 mm long, with one pair of glands near the apex. Petioles 1,3–1,7 cm long, hairy, with one pair of ovate, sessile glands, ca. 1 mm diam., 0,3–1,7 cm from the base of the petiole. Leaves

Figure 2. Flowers of Passiflora species. A) *Passiflora garckei* Mast.; B) *Passiflora retipetala* Mast.; C) *Passiflora tholozanii* Sacco.

oblong-ovate, entire, 7,5–11,5 × 3,7–5 cm, rounded to subcordate at base, acuminate at apex, pinnately veined, membranaceous, adaxially hairy, abaxially tomentose, margins crenate-serrate, nectaries presents, 147–200 pieces. Tendrils weak, color not seen. Flowers solitary, from older parts of the plant, pendent to suberect; pedicel terete, striate, tomentose, 0,4–0,7 cm long; bracts present, verticillate, oblong-ovate, free from the hypanthium, inserted 3–4 mm below flower, 3–3,5 × 0,9–1 cm, margins crenate with 8–9 glands; hypanthium campanulate, 4–5 mm long, hairy; sepals oblong, 3,5–4 × 1–1,3 cm, straight at base, acuminate at apex, color not seen, abaxially hairy; awn present, linear to slightly hooked, 3-5 mm long; petals oblong, 3–3,5 × 0,8–1 cm, straight at base, acuminate at apex. Corona filaments of 2 series; outer series exceeding the second rank, stout throughout at apex, subulate, ca. 1,3 cm long, slightly inclined; second series stout throughout at apex, filiform, ca. 8 mm long, suberect; operculum membranaceous, reflexed, margin filamentous. Trochlea absent. Androgynophore ca. 4,5 cm long, color not seen; ovary tomentose, ca. 7 mm long, ca. 3 mm diam. Fruits not seen.

Specimens examined: **BRAZIL. Maranhão:** Colonia Bethel, right margin of the Alto Turiaçu river, 22-V-1979, fl., Jangoux and Bahia 793 A (MG); Monção, Turiaçú river basin, Kapoor Indian Reserve, 7 km of the settlement of Urutawy, 09-V-1985, fl., Balée 934 (MG).

Passiflora tholozanii Sacco is easily confused with *P. araujoi* Sacco and *P. coccinea* Aubl., since all three species have red flowers with similar shape, and pilose leaves with crenate to serrulate margins. However, these species can be differentiated by the series numbers of the corona filaments. While *P. araujoi* and *P. coccinea* have three sets of filaments, *P. tholozanii* has only two (Cervi and Dunaiski Jr. 2004). In Brazil, *P. tholozanii* can be found in the states of Roraima, Amapá, Pará, Amazonas, Rondônia, and Mato Grosso (Cervi and Dunaiski Jr. 2004; Bernacci *et al.* 2014). In this work it is newly registered for the state of Maranhão in a remnant of Amazonian forest and officially part of the Brazilian Amazon (Figure 3).

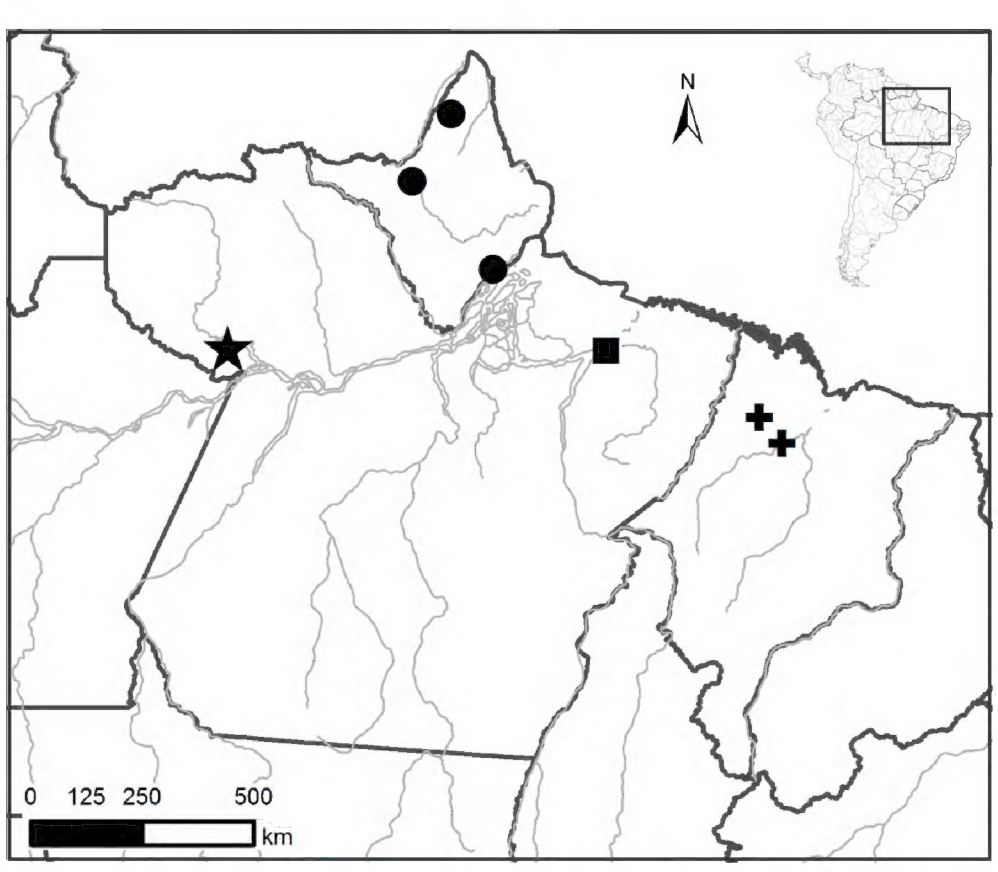

Figure 3. Localities of new records of Passiflora in the Brazilian Amazon. Circle: Passiflora candida; Star: *Passiflora retipetala*; Square: *Passiflora garckei*; Cross: *Passiflora tholozanii*.

Acknowledgments: We are grateful to the curators of the herbaria MG and IAN, Dr. Ricardo de S. Secco and Dra. Regina Célia Viana Martins da Silva, respectively, for permitting the access to the Passifloraceae collections; and to João Batista Fernandes da Silva (STCP Engenharia e Projetos) for making available selected specimens of *Passiflora* collected during the fieldwork of the project "Manejo e Monitoramento das epífitas e ervas de subosque", executed by the Mineração Rio do Norte (MRN), and Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio). The first and second authors thank the CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico) and MCTI (Ministério da Ciência, Tecnologia e Informação) for granting their PCI (Programa de Capacitação Institucional) fellowships during this work.

Literature Cited

Brummitt, R.K. and C.E. Powell 1992. *Authors of plant names*. Kew: Royal Botanic Gardens. 732 pp.

Bernacci, L.C., A.C Cervi, M.A Milward-de-Azevedo, T.S.Nunes, D.C. Imig and A.C. Mezzonato. 2013. Passifloraceae, in: *Lista de Espécies da Flora do Brasil.* Jardim Botânico do Rio de Janeiro. Accessible at http://floradobrasil.jbrj.gov.br/2012/FB000182. Captured on 22 October 2013.

Cervi, A.C. 1997. Passifloraceae do Brasil. Estudo do gênero *Passiflora* L., subgênero *Passiflora*. *Fontqueria* 45: 1–93.

Cervi, A.C. 2002. A new species of *Passiflora* (Passifloraceae) from Amazonian Brazil. *Brittonia* 54(1): 54–56.

Cervi, A.C. and J.R.A. Dunaiski. 2004. Passifloraceae do Brasil: Estudo do gênero *Passiflora* L. subgênero *Distephana* (Juss.) Killip. *Revista Estudos de Biologia* 26(55): 45–67.

Cervi, A.C. and L. Linsingen. 2008. Sinopse taxonômica das Passifloraceae Juss. no complexo de cerrado (savana) no estado do Paraná – Brasil. *Iheringia*, Série Botânica 63(1): 145–157.

Cervi, A.C. and L. Linsingen. 2010. *Passiflora kikiana*, a new species of Passifloraceae from the Brazilian Amazon. *Acta Botanica Brasilica* 24(4): 1062–1064.

Cruz, A.P.O., Sousa, J.S., Bastos, M.N.C. and Barbosa, C.V.O. 2013. *Passiflora* (Passifloraceae) in the Urucu Petroleum Province, Coari, Amazonas, Brazil. Rodriguésia 64(1): 113–122.

Hopkins, M.J.G. and M.A.D. Souza. 1999. Passifloraceae; pp. 299–306, in: J.E.S. Ribeiro, M.J.G. Hopkins, A. Vicentini, C.A. Sothers, M.A.S. Costa, J.M. Brito, M.A.D. Souza, L.H.P. Martins, L.G. Lohmann, P.A.C.L. Assunção, E.C. Pereira, C.F. Silva, M.R. Mesquita and L.C. Procópio. (ed.). *Flora da Reserva Ducke: guia de identificação das plantas vasculares de uma floresta de terra-firme na Amazônia central.* Manaus: INPA.

Killip, E.P. 1938. *The Americam Species of Passifloraceae* [concl.]. Publications of the Field Museum of Natural History, Botanical Series 19(2): 333–613.

Koch, A.K., A.L.R. Cardoso and A.L. Ilkiu-Borges. 2013. A new species of *Passiflora* subgenus *Passiflora* series *Quadrangulares* (Passifloraceae) from the Brazilian Amazon. *Phytotaxa* 104(1): 43–48.

Masters, M.T. 1872. Passifloraceae; tab. p. 106–128, in: C.F.P. Martius. *Flora brasiliensis* 13(1): 527–628.

Milward-de-Azevedo, M.A. 2008. Three new species of *Passiflora* subgenus *Decaloba* (Passifloraceae) from Brazil. *Brittonia* 60(4): 310–317.

Milward-de-Azevedo, M.A. J.F.A. Baumgratz and V. Gonçalves-Esteves. 2012. A taxonomic revision of *Passiflora* subgenus *Decaloba* (Passifloraceae) in Brazil. *Phytotaxa* 53: 1–68.

Mondim, C.A., A.C. Cervi, and G.R.P. Moreira. 2011. Sinopse das espécies de *Passiflora* L. (Passifloraceae) do Rio Grande do Sul. *Revista Brasileira de Biociências* 9(1): 3–27.

Radford, A.E., W.C. Dickison, J.R. Massey and C.R. Bell. 1974. *Vascular Plant Systematics*. Harper & Row Publishers, New York. 891 pp.

Silva, E.O., Santos, J.U.M and Dias, A.C.A.A. 2013. Passifloraceae in the Environmental Protection Area of Belém, PA, Brazil. Rodriguésia 64(4): 829–845.

Souza, M.A.D and M.J.G. Hopkins. 2011. *Passiflora fissurosa*, a new species of *Passiflora* from Amazon, Brazil. *Acta Amazonica* 41(4): 449–452.

Ulmer, T. and J.M. MacDougal. 2004. *Passiflora: Passionflowers of the World.* Timber Press, Cambridge. 418 pp.

Vanderplank, J. and D. Zappi. 2011. *Passiflora cristalina*, a striking new species of *Passiflora* (Passifloraceae) from Mato Grosso, Brazil. *Kew Bulletin* 66: 149–153.

WWF. 2009. *Amazônia viva! Uma década de descobertas, 1990–2009*. Brasília. 64 pp.

Received: November 2013
Accepted: February 2014
Published online: May 2014
Editorial Responsibility: James Byng